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**Method for ensuring the same order of messages in a
plurality of data sinks**

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CLAIM FOR PRIORITY

This application claims the benefit of priority to German
Application No. 10302859.5 which was filed in the German
language on January 22, 2003, the contents of which are
10 hereby incorporated by reference.

TECHNICAL FIELD OF THE INVENTION

The invention relates to a method for ensuring the same
order of messages in a plurality of data sinks.

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BACKGROUND OF THE INVENTION

In the case of multicomputer systems, in particular, it is
necessary for the receivers, or data sinks, to receive the
data messages originating from a plurality of transmitters,
20 or data sources, in the same order. This requires a
constrained synchronization of the data sinks.

SUMMARY OF THE INVENTION

The invention discloses a method in which the data sinks are
25 synchronized in such a way as to ensure the same message
order of the data messages in different data sources.

In one embodiment of the invention, the clock generator
transmits a broadcast message cyclically, for example at
30 equidistant time intervals of 50 ms. The message comprises a
consecutive clock generator number, preferably in the 32-bit
format. The current clock generator number is stored in each
data source. Before a message is written to the transmission
buffer of the data source, this is provided with a message

header comprising the current clock generator number and a consecutive message counting number within the clock cycles, preferably in the 8-bit format. As long as the clock generator number has the same value, the message counting
5 number is increased by one upon the generation of the message header. If the data source receives a new clock generator number from the clock generator, the message counting number is reset to the initialization value. The next time a message is written to the transmission buffer,
10 the message is in turn preceded by the current clock generator number together with the message counting number = 1. On account of the items of information in the message header, namely clock generator number and message counting number, the same order of messages can be established in all
15 the data sinks.

In another embodiment of the invention, in the data sinks, in addition to the clock generator number and the message counting number, the sender address is also used for
20 sorting. The sorting instant is determined by the fact that a determined time on the basis of a number of clock cycles, preferably of the order of magnitude of five clock cycles, must have elapsed. This ensures that all data sinks have received at least all messages with the oldest clock
25 generator numbers.

In still another embodiment of the invention, the cycle time of a central clock generator may be lengthened by only using the central clock generator to synchronize the clock
30 generators assigned to each individual data source. In this case, for the sake of simplicity, the cycle time of the central clock generator is an integral multiple of the cycle time of the clock generators assigned to the data sources.

The current value of the internal clock generator of the data source is then entered in the message header.

BRIEF DESCRIPTION OF THE DRAWINGS

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The invention is explained in more detail below on the basis of exemplary embodiments and illustrations, in which:

10 Figure 1 shows a schematic illustration of a communication structure.

Figure 2 shows a message construction for ensuring the same order of messages in the case of a communication structure in accordance with figure 1.

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DETAILED DESCRIPTION OF THE INVENTION

20 Figure 1 shows three data sources DQ that transmit identical message contents to four data sinks DS in parallel, but independently of one another.

25 In order to ensure that the data messages arrive at the data sinks DS in the same order as they are generated by the data sources DQ, a special message construction is provided, which is illustrated in figure 2.

30 For this purpose, each individual message N is preceded by a message header NK. Said message header NK comprises a clock generator number TG-Nr. and a message counting number TZ. The clock generator number TG-Nr. is generated by a clock generator TG incorporated into the network and is communicated synchronously to all the data sources DQ (Figure 1). In addition, a plurality of message counting numbers TZ, for example five in each case, are generated per

clock generator number TG-Nr. When the next clock generator number TG-Nr. is present, the message counting number TZ is reset to one and restarted. In this way, the data sinks DS for which the messages N are intended are able, on the basis
5 of the sender address, the clock generator number TG-Nr. and the message counting number TZ, to sort all incoming messages N in the same order.

The invention is not restricted to the exemplary embodiment
10 mentioned above. Rather, a number of variants are conceivable which make use of the features of the invention even with an embodiment of a fundamentally different configuration.